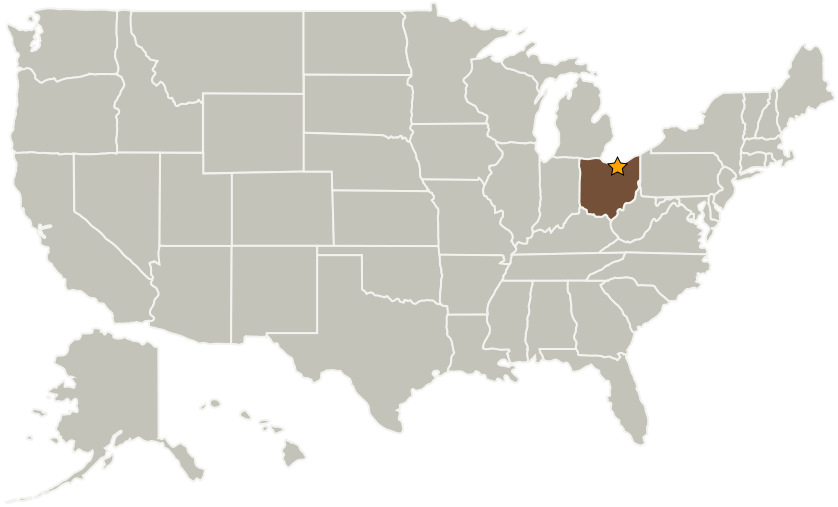
Nanoporous Membrane for Medical Grade Water Generation, Phase I

Completed Technology Project (2007 - 2008)

Project Introduction

For NASA exploration missions to the Moon and Mars, medical grade water generation is a necessity. Adsorption filter technology has shown some promise, but requires transport of disposable/replacement filter cartridges, which adds to the overall mass/volume of the system for medical grade water generation. Distillation and reverse osmosis are other techniques that are used to generate medical grade water. However, power requirements, processing rates, and microgravity affects render these techniques undesirable for NASA missions. Therefore, we propose to develop a compact, low-power nanofiltration system for the generation of medical grade water. The key nanofiltration component will be a soda can-sized package housing a stack of silicon nanoporous membranes to process onboard potable water. The system would generate ~2 liters/hour of purified water with <1 psi differential driving pressure. In Phase 1, we would complete fabrication of silicon nanoporous membranes, test them for nanofiltration of endotoxins, and develop an optimized design for the next generation of miniaturized nanoporous membranes. In Phase 2, we would fabricate the optimized design, manufacture a portable medical grade water generator based on the optimized design, and test the system for endotoxin filtration.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
H-Cubed, Inc.	Supporting Organization	Industry	Olmsted Falls, Ohio

Primary U.S. Work Locations
Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.3 Resource Processing for Production of Mission Consumables